Commercial Space Transportation Advisory Committee
(COMSTAC)
October 18, 2001
MEETING MINUTES

COMSTAC Chair, Livingston L. Holder, Jr., Senior Manager, Information Products, Advanced Space and Communications, Phantom Works, The Boeing Company, convened the meeting at 8:30 a.m., and welcomed COMSTAC members and guests. He commented that in the changed, post-September 11th world, the U.S. commercial space transportation industry has, like most things, been affected. He added that the industry is small but tenacious, and though not financially robust, it has people who are strong in spirit with an unfailing belief that the industry can work. He pointed out that there have always been periods of growth and retreat and urged all to hold on through this tough period. Chairman Holder reported that the spring COMSTAC meeting would be held on Thursday, May 23, 2002 in the same location at FAA Headquarters, with working groups meeting on Wednesday, May 22.

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Report on AST Activities

Patricia G. Smith, FAA's Associate Administrator for Commercial Space Transportation, welcomed members and guests and thanked COMSTAC members for their outstanding work and continued support of the work of FAA/AST. She noted that the events of September 11 "raised the specter" of potential attacks or acts of sabotage at launch sites and the consequences of such acts. She reported that AST has established a working group to examine security issues for FAA- licensed commercial launch operations and commercial launch sites, as well as security issues for international commercial launch operations.

Ms. Smith introduced Hugh Cook, Manager for AST's newest division, Systems Engineering and Training. Mr. Cook discussed the functions and responsibilities of his division, noting that the Division's charter calls for developing standards and efficient methods of verifying those standards. He also introduced some of the members of his Division: Jim Kabarra, Charles Huet, Yvonne Tran, Peggy McGonigal, Troy Statton, Lyndon Bonaparte, Stewart Jackson, and Stanley Johnson. Ms. Smith then introduced additional new staff members in AST including Richard Dacko, Mark Wright, Rick Caplette, Doug Nelson, Obi Ndu, Leland Walcott, Chris Draper, Denny Mathew, Michael Chan, and Sheila Helton-Ingram.

Ms. Smith reported on the continuing work of the Federal interagency community on the White House-led strategy on the Future Use and Management of Space Launch Ranges, adding that the FAA, Department of Commerce, and the Air Force have completed an agreement and a process for collecting commercial requirements for range operations and improvements.

Legislative Update

Jean Toal Eisen, member of the Senior Democratic Professional staff for the Senate Committee on Commerce, Science, and Transportation, provided the legislative update for the COMSTAC members. She reported that legislative activity for commercial space transportation is minimal right now because most legislation is focused on finishing bills concerned with appropriations and transportation safety. She pointed out that the small number of launches for the year has caused legislators to question the need for loan guarantees and tax breaks. She also pointed out that the resignation of NASA Administrator, Dan Goldin, will probably cause some of the NASA commercialization efforts to be put on hold. She stated that assured access to space, especially for military purposes and the International Space Station are the two major space issues currently receiving the most attention. She applauded the efforts of AST to make good on its commitment to utilize the additional FY 01 appropriations wisely by indicating how thrilled she was to see the new AST employees.

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Liability/Financial Responsibility Report

COMSTAC member, John Vinter, chair of the RMWG and President and CEO of International Space Brokers, Inc., provided an overview of the final version of the Liability Study, prepared by the COMSTAC Risk Management Working Group. He noted for background information that the Commercial Space Transportation Competitiveness Act of 2000, enacted on November 1, 2000, covers the financial responsibility regime including indemnification extended through 2004. He pointed out that the Act covers expendable, as well as, reusable launch vehicles, and requires that the licensee obtain liability insurance at no cost to the government, in an amount determined by the FAA, not to exceed $500 million, based on an FAA maximum probable loss analysis. He also pointed out that the indemnification is subject to appropriation, and the intent is for the government to indemnify for claims in excess of insurance up to $1.5 billion, adjusted for inflation. He said that Congress asked that seven areas be covered in the report on liability and he provided the conclusive findings for each of the areas:

1. **Analyze the adequacy, propriety, and effectiveness of, and the need for, the current liability risk-sharing regime in the United Sates for commercial space transportation.**

Finding

The current regime is adequate, proper, effective and necessary because it:

1) **Sustains and enhances competition** by creating a level playing field that enables U.S. launch providers to compete effectively with their foreign counterparts; protects U.S. launch providers, their customers and contractors/subcontractors, enabling launch providers to attract domestic and international customers; reduces overall launch costs; and alleviates foreign customers' concerns about unlimited third-party liability and tort litigation in the U.S. due to the regime's insurance requirements and Government participation in the risk-sharing.

2) **Ensures financial responsibility and financial security** which enables U.S. launch companies to operate without having "to bet the company" with each launch; protects the U.S. Government to use private insurance to pay claims arising under private law and public international law, specifically the Liability Convention; and limits the threat of litigation through mandatory inter-party waivers of liability that include the U.S. Government.
3) **Is vital to U.S. national security** since it protects those companies that, when not launching commercial payloads, are launching U.S. civil and military payloads; creating an environment in which the U.S. space transportation scientists and engineers are encouraged to develop safer, more efficient and more cost-effective means of assuring access to space; and helps to provide a solid foundation for our defense industrial base.

The current regime should not be replaced with or modified to look like a risk management plan for the airline industry because the two industries are not the same.

The current regime is also beneficial to the U.S. taxpayer because it:
- Has cost the U.S. taxpayer nothing since its inception in 1988;
- Allows the U.S. Government-customer and, in turn, the U.S. taxpayer, to benefit from the efficiencies developed through U.S. launch services providers' commercial businesses;
- Provides, without any non-contingent cost to the U.S. taxpayer, an environment that encourages, facilitates and promotes the U.S. commercial space launch industry, an industry that is vital to U.S. economic and national security, advances U.S. foreign policy, generates thousands of highly-skilled, high-technology jobs, and enables countless important opportunities for advances in many critical areas (including communications, medicine, education, etc.).

2. Examine the current liability and liability risk-sharing regimes in other countries with space transportation capabilities.

Findings
- The biggest challenger to the U.S. industry is Western Europe (i.e., Arianespace), which provides a comprehensive cross-waiver scheme similar to the U.S. and covers both property and persons involved in launch activity; comprehensive insurance protection to the launch customer and no cost to the customer, and indemnifies the launch customer against third-party claims that exceed the insured limits, not subject to appropriations.
- The People's Republic of China (the Long March) offers insurance protection in the amount of $100 million (U.S.), with full indemnification for claims exceeding the liability insurance.
- Russia (Khrunichev) provides up to $300 million of insurance protection against third-party claims and indemnifies the launch customer against third-party claims in excess of the amount of insurance.
- Japan provides 20 billion yen (U.S. $64 million) of insurance against third-party claims, plus full indemnification.

- Australia's Government makes the maximum probable loss (MPL) determination, setting amounts of required private insurance protection against third-party claims and claims in excess of the required insurance, payable by the government.
- All systems provide better protection than the U.S.

3. Examine the appropriateness of deeming all space transportation activities to be 'ultrahazardous activities' for which a strict liability standard may be applied and which liability regime should attach to space transportation activities, whether ultrahazardous activities or not.

Finding

It is not appropriate to deem, by legislation, all space transportation activities to be "ultrahazardous" to which a strict liability standard might be applied.

4. Examine the effect of relevant international treaties on the Federal Government's liability for commercial space launches and how the current domestic liability risk-sharing regime meets or exceeds the requirements of those treaties.

Findings

- The Convention on International Liability for Damage Caused by Space Objects provides that the U.S. is liable to pay compensation for damage/injury caused by space objects (includes FAA licensed launches).
- The Commercial Space Launch Act requires the licensee to obtain insurance, in an amount determined by the USG, but not to exceed $500 million, protecting the USG from property damage (up to $100 million) as well as third-party claims. The result is that the government receives assured protection in an amount specified by the U.S. Government up to the limits of its calculated MPL.
- This scheme, therefore, affords substantial and assured private financial protection to the government to meet its treaty obligations under the Liability Convention and puts the government in a position to control, through its licensing process, the nature and scope of the risk to the U.S. government that it assumes under the convention.
- Government indemnity protection is afforded to the licensee subject to the availability of appropriated funds.

5. Examine the appropriateness, as commercial RLVs enter service and demonstrate improved safety and reliability, of evolving the commercial space transportation liability regime towards the approach of the airline liability regime.

Findings

- Future RLVs will operate more like conventional aircraft, with multiple launch and landing sites; however, the low volume of RLV flights will make it impossible for the RLV sector to finance its entire insurance requirements.
- For ELVs, which are not similar to commercial airplanes, it is inappropriate to replace or modify current space risk allocation schemes at this time.

6. **Examine the need for changes to the Federal Government's indemnification policy to accommodate the risks associated with commercial spaceport operations.**

Findings

- Under the Commercial Space Launch Act's (CSLA) risk sharing regime, launch site and reentry site operators are covered as additional insureds under the launch licensee's third party liability insurance if such sites support licensed launch or reentry. Licensed activities are covered and the FAA has determined other activities not eligible for indemnification.
- Two launch site operators, Spaceport Florida Authority and Virginia Commercial Space Flight Center, want the FAA to extend to them the full benefits of the CSLA's risk allocation regime.

7. **Recommend appropriate modifications to the commercial space transportation liability regime and the actions required to accomplish those modifications.**

Findings

The primary weakness in the current regime is the unpredictability of the expiration date in the CSLA. The sunset provision is exploited by foreign competitors, such as Arianespace, who can claim better protection.

Conclusion: The CSLA should be amended to delete the sunset provision or to extend the application for the indemnification provision for at least a 10 year period from the current expiration date.

Chairman Holder advised meeting attendees that the COMSTAC members had reviewed the report and a majority voted to accept the report and have it submitted to AST. He added that there might be future improvements and additions to the report.

COMSTAC member, John Logsdon, asked why only two spaceports have applied for CSLA coverage. Mr. Vinter replied that if a spaceport is involved in a commercial space launch activity, it is covered.

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Update: FAA's NPRM on Licensing and Safety Requirements for Launch

Michael Dook, Project Engineer in AST's Licensing and Safety Division, provided an update on the Notice of Proposed Rulemaking (NPRM) on Licensing and Safety Requirements for Launch. He reported that an NPRM, which applies to ELVs only, was published October 25, 2000, with a 120-day comment period, which was later extended an additional 60 days, finally ending on April 23, 2001. He noted that the comments received indicated significant concerns and some misunderstanding especially regarding how the launch safety requirements would apply at existing Federal ranges where the Air Force is so extensively involved. He stated that because of this, the FAA made a

determination to do a Supplemental Notice of Proposed Rulemaking (SNPRM). He noted that on January 16, 2001, the FAA and the Air Force entered into a Memorandum of Agreement which calls for the development of common safety standards and the processes for implementing those standards for launches from the Federal ranges.

He reported that in addition to the SNPRM, the FAA also reinvigorated the FAA/Air Force Common Standards Working Group (originally started two years ago) to help resolve some of the issues and concerns, and to avoid competing safety requirements, expanding the make-up to include, not only range safety personnel, but also to include Space Command, Air Force Headquarters, and the Air Force Space and Missile Center. He reported that the Working Group included a newly-developed Senior Steering Group to provide guidance and resolve impasses, tri-chaired by General Howard Mitchell of Air Force Space Command, Patricia Smith, FAA Associate Administrator for Commercial Space Transportation, and Richard McCormick, Deputy Assistant Secretary of the Air Force for Space Policy; and four sub-working groups which meet twice weekly through teleconferencing. The sub groups cover risk assessment, compliance (implementation and flexibility), flight analysis requirements, and flight termination system requirements. He explained that the flight analysis requirements group is working to develop a set of top level performance requirements for flight safety analysis that regardless of the range, the requirements satisfy the user, with the understanding that the methodologies and the implementation may vary from range to range, and the flight termination system requirements group is examining the numerous detailed, technical comments and input. He said that the Working Group results would be incorporated into the SNPRM and the Air Force Space Command Manual 91-701, which is proposed to be issued at that same time as the FAA Final Rule.

Mr. Dook reported that the SNPRM, which will have a 60-day comment period, will address FAA authority; duplication of effort; how the baseline assessments of Federal ranges will work; flexibility in waivers, equivalent level of safety, and tailoring the requirements for specific programs; grandfathering possibilities; some revisions to the proposed risk criteria; some new text; cost predictions (made by the industry); and revisions to the proposed flight analysis requirements. He stated that the goal is to publish the SNPRM by Fall 2001 and the Final Rule by Spring of 2003. He also emphasized the fact that there would be two documents, the FAA Final Rule and the Air Force Range Safety Manual each containing the same set of requirements. He explained that during day-to-day activities, the launch operator would work with the Air Force document for safety concerns at the Eastern and Western ranges, and be assured that the FAA requirements are being satisfied; the Air Force document will encompass the FAA common launch safety requirements.

COMSTAC member, Lou Gomez asked whether the SNPRM would address RLV operations from non-Federal sites? Mr. Dook responded that it would not.

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Presentation: Department of Defense (DOD) Acquisition Policy and Approach
Kenneth Gordon, Special Assistant to the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD, (AT&L)), gave a presentation on the DOD's acquisition goals and strategies as envisioned by Pete Aldridge, the Under Secretary of Defense. He discussed five goals that the USD (AT & L) would be pursuing:

1) **Achieving credibility and effectiveness in the acquisition workforce** by making the system work through "acquisition excellence" as opposed to "acquisition reform";
2) **Revitalizing the quality and morale of the DOD acquisition and logistics workforce** through the utilization of a younger, technically competent, and visionary people. This is made more urgent since 50% of the current acquisition workforce is eligible for retirement in the next five years;
3) **Improving the health of the defense industrial base** by no longer requiring companies to use their own research and development money for Government research purposes and by increasing progress payments from 75 to 80% as Government contracts are executed;
4) **Rationalizing the weapons system and infrastructure with defense strategy** through such initiatives as base closings under the Efficient Facilities Initiative, the Quarterly Defense Review; and the identification of savings in the 2003 DOD budget by the Business Initiatives Council; and
5) **Initiating high-level technologies to enhance future warfighting capabilities and systems** to look at advanced research and development, science and technology funding, to ensure that research programs are done in conjunction with defense strategies and program building activities, and to ensure adequate resources.

Mr. Gordon also discussed the strategy of spiral development, which he explained as a concept of completing and using increments of a full system, instead of waiting long periods of time for the full system. He pointed out that, in order to actually achieve the above-mentioned goals, the USD (AT&L) is developing a series of metrics to track the performance of each goal. He gave examples of the types of tracking and performance measures that were being implemented, including tracking customer-wait time for equipment and supplies, tracking how many people are being hired from outside Government, and measuring the customer satisfaction index of the defense warfighter.

COMSTAC Chair, Livingston Holder, asked whether the Army's Future Combat Systems program would be a good way of testing the spiral development concept. Mr. Gordon replied that it would be a good example. Mr. Holder also asked whether the research would be shared even more between NASA and the Air Force on the Space Launch Initiative? Mr. Gordon replied that the research targeted by the DOD acquisition program deals with private companies as opposed to the Government. Dr. Logsdon asked how the DOD would be getting its existing and future space systems. Mr. Gordon replied that it was too early in the process to address that issue.

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WORKING GROUP REPORTS

Risk Management Working Group (RMWG)

Mr. Vinter presented the report for the Risk Management Working Group (RMWG), which focused on the status of the insurance market. He reported that 2001 was not a good year for the insurance industry with one on-orbit failure, two launch failures, one product line of 6 satellites experiencing generic defects. He also noted that the estimated premiums for the year were approximately $475 million. He stated that 2001 premiums were down due to launch delays, and this, in addition to the World Trade Center losses, will result in higher rates, shorter periods of coverage (one year versus three years), more onerous conditions, and reduced capacity in 2002.

COMSTAC member, Janet Sadler, Senior Vice President, Redholm Underwriting Agents Limited in London, provided a status of the market from an international perspective, focusing on the post-September 11th market. Ms. Sadler emphasized that it is still too early to identify specific trends; however, it is certain that there will be "...massive financial losses on a unprecedented scale," adding that the insurance industry is sufficiently capitalized and financially robust to meet the current commitments. She noted several possible future occurrences as a result of the catastrophic losses:

- premium levels will increase across the board;
- a period of temporary instability will occur and companies will be coming up with various means of trading through the crisis;
- the market will operate within the constraints of a reduced capital base;
- remaining capacity will be rationed and allocated to areas of best potential growth and return;
- movement away from the small catastrophic lines of business.

Ms. Sadler pointed out that as a niche market, the launch and on-orbit insurance for satellites is particularly vulnerable to distributions of capacity, and space insurance will have to compete for more limited resources. She noted that since lower satellite capacity was already anticipated for 2002, the markets would be even more reduced. She added that space third-party liability, which is provided through the aviation insurance market, would be subject to the vulnerabilities and changes of the industry, i.e., increased cost and decreasing availability. She concluded that fortunately, aviation liability would remain available.

COMSTAC member, Steve Flajser, suggested that the Committee present the Liability Study, completed by the Risk Management Working Group, to Congress. Member, John Logsdon, raised the issue of affordability and the impact it could have on a company's decision to carry out a launch. Mr. Vinter responded that he didn't think that capacity would dry up or become so expensive that business would be halted, but that the real problem would be that insurance for a $350 million satellite could be very expensive and difficult to obtain.

COMSTAC member, Bob Ragan, inquired about the availability of war risk insurance, and whether the FAA could look at the impact on commercial space in the same way that it has examined the impact on airlines.

Technology and Innovation Working Group (TIWG)

Bob Cowls, Sales Director--Americas, Delta Launch Services, Inc. for The Boeing Company, provided an update on the activities of the TIWG since the May 10, 2001 meeting. He reported on the TIWG's meeting with the Air Force EELV Special Program Office in El Segundo, California on June 8th. He also reported that the TIWG had provided the results of the 2001 Commercial Space Transportation Market Forecasts to the Federal interagency group on June 19th. He reported that future activities for the TIWG would include initiating work on the ***2002 Commercial Geostationary Launch Demand Model***, adding that the TIWG would be readdressing the 10-year forecast horizon especially in light of longer satellite life and long-term procurement actions, as well as considering other emerging markets such as servicing satellites on-orbit.

Chairman Holder and Ms. Smith made a presentation to Mr. Cowls in honor of Boeing employee, Mr. Henry Minami, long-time secretary for the COMSTAC TIWG, who recently retired from Boeing.

Reusable Launch Vehicle Working Group (RLVWG)

Paul Birkeland, Vice President, Kistler Aerospace, provided the report for the RLVWG, standing in for RLVWG Chair, Mike Kelly, Chairman of Kelly Space & Technology. Mr. Birkeland reported on the briefing and video presented by Jeff Greason of XCOR Aerospace, on the third test flight of the engines for the EZ Rocket.

Mr. Birkeland reported on tasks that the RLVWG is currently working on for FAA/AST including the review of FAA's draft Advisory Circular on RLV Flight Testing and the development of 10 topics or issues for future research and development projects. He also discussed the report entitled ***GPS Vulnerabilities***, prepared by the Department of Transportation Volpe Center, Cambridge, Massachusetts, noting that the report did not address space applications and that it had a negative overtone for GPS. He encouraged everyone to study the report and provide comments to DOT.

Launch Operations and Support Working Group (LOSWG)

The LOSWG report was presented by Darren Buck, Project Lead for Florida Operations, Strategic Planning and Business Development, United Space Alliance. Mr. Buck reported on the October 4th teleconference held by the LOSWG . He noted that the newly-formed subgroup on launch operations safety issues, led by Sri Iyengar of Lockheed Martin, will be providing comments on the FAA SNPRM. He also reported that the LOSWG would be providing additional comments to AST on the Interagency Forum for Operational Requirements for the GPS-3 system.

Mr. Buck reported that Major Wayne Hayes of Space Command participated in the October 4th telecon and provided information on Space Command's Grand Strategy Steering Group, which is reviewing range services and range requirements in the 2010 to

2012 time frame. He also reported that the LOSWG would be considering working with Space Command's Range User Coordination Board and would be working with the Advanced Range Technology Working Group and the Advanced Spaceport Technology Group.

COMSTAC member, Lou Gomez, asked whether the newly-formed subgroup on launch operations safety issues would include RLVs. Mr. Buck responded that it would not, it would only include ELVs.

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Wrap Up

Since there was no new business, the meeting was adjourned at 11:55 a.m., subject to the call of the Chair.

Livingston L. Holder, Jr.

Livingston L. Holder, Jr., Chairman, COMSTAC

November 16, 2001

ATTENDEES

COMSTAC Members

Livingston Holder, COMSTAC Chairman, The Boeing Company
Paul Birkeland, Kistler Aerospace (Alternate for Michael Kelly)
Alfred Boyd, Science Applications International Corporation
Robert Cowls, The Boeing Company
Christopher DeMars, Orbital Sciences Corporation (Alternate for Mark Bitterman)
Steven Flajser, Loral Space and Communications, Ltd.
Louis Gomez, New Mexico Office of Space Commercialization
Charles Hall, American Airlines (Industry Partnership)
John Hussey, The Aerospace Corporation (Alternate for Alex Liang)
John Logsdon, George Washington University
Roscoe Moore, SpaceVest
Gerald Musarra, Lockheed Martin (Alternate for Mark Albrecht and G. Thomas Marsh)
William Pickavance, United Space Alliance (Alternate for Russell Turner)
Oren Phillips, Alliant Aerospace Propulsion Company (Alternate for Jeffrey Foote)
Robert Ragan, Bechtel Group, Inc.
Billie Reed, Virginia Commercial Space Flight Center
Janet Sadler, Redholm Underwriting
John Vinter, International Space Brokers, Inc.

FAA Associate Administrator for Commercial Space Transportation

Patricia G. Smith, Associate Administrator for Commercial Space Transportation
Joseph Hawkins, Deputy Associate Administrator for Commercial Space Transportation

Antonio Abadia
Diwan Bhathal
Lyndon Bonaparte
Herb Bachner
Brian Campbell
Richard Caplette
Michael Chan
Kelvin Coleman
Hugh Cook
Richard Dacko
Mike Dook
Christopher Draper
Carole Flores
Douglas Graham
Ron Gress
Sheila Helton-Ingram
Patrick Hoar
Charles Huet
Stewart Jackson
Stanley Johnson
Jim Kabbara
Chuck Kline
Randy Maday
Laura Montgomery (FAA/AGC)
Douglas Nelson
Obi Ndu
Brenda Parker
Randy Repcheck
Esta Rosenberg (FAA/AGC)
John Sloan
Amy Snyder
Troy Statton
Yvonne Tran
Leland Walcott
Michon Washington
Al Wassel
John Weglian
Mark Wright
Stephanou Yonkeu

Guests

Bob Anderson
The Boeing Company

Paul Armbruster
FAA /ARS-200

Terry Bain
R.E.B.Corp

Jason Bates
Space News

Jack Bertron
FAA / AFS-410

Robert R. Bocek
Boeing

Lester Bridgeman
Air Launch

Major Timothy P. Brown
HQ/USAF/XOSR

Darren Buck
United Space Alliance

Richard Buenneke
The Aerospace Corporation

Scott Burnell
UPI

Elaine David
Lockheed Martin Corporation

Janice Dunn
California Space Authority

Paul Eckert
Department of Commerce, Office of Space Commercialization

Bill English

Betty K. Falato
FAA /ASD-110

Ray Fenster
IOC

Uma Ferrell
FAA Consulting

Jay Finch
U. S. Air Force (SAF/SX)

Sean Fleming
Law Offices of Pamela Meredith

John Gantt
Mizrack & Gantt

Gary Goodwin
Space Systems/Loral

Ed Gormel
Spaceport Florida Authority

Eric Hendrixon
NRG

David Hoff
Air Force

Janice Horn
RTI

Tim Huddleston
NCSS

John Hudiburg
NASA-Kennedy Space Center

Jontu Kasku-Jackson
Sigmatech for HQ AESPC/DOS

Sid Kimhan
Practical Innovations

Col. Blaise Kordell
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Theodore Kronmiller
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Bruce Mahone
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Sergey Masmuron

Steven Mirsky
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Stephen Morgan
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Clayton Mowry
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Frederic Nordlund
European Space Agency

Rosemary Nurse
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David Pollock
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Bert Randall
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Harold Reck
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Dal Sherman
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Phil Smith
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Tom Stagliano
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Hank Sterbenz
ITT Industries

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